

MoniAR, Phase I

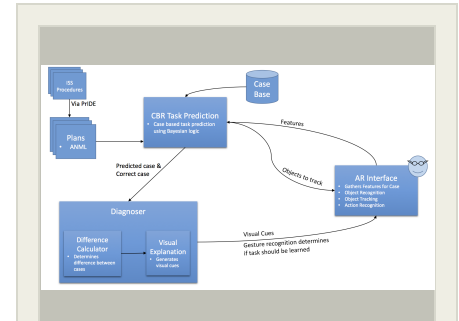
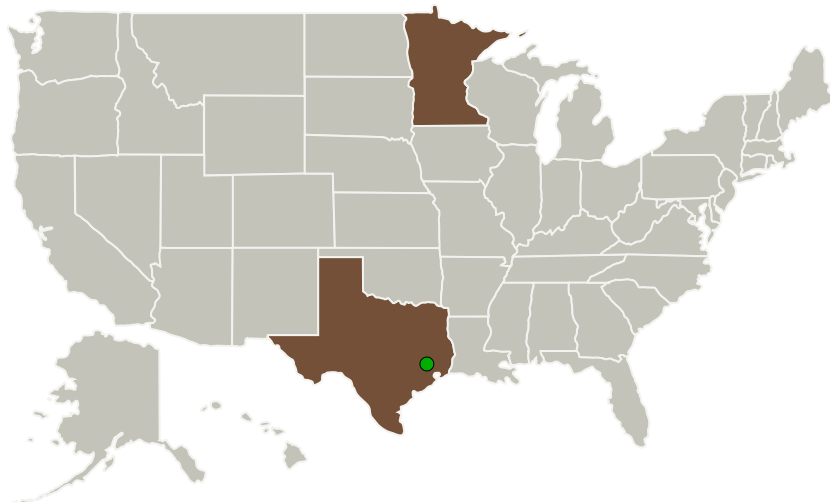
Completed Technology Project (2016 - 2016)



Project Introduction

We propose to develop MoniAR, an Augmented Reality (AR) system that provides procedure completion guidance to astronauts. MoniAR will replace guidance from mission control during periods of long time delay or when communication with Earth is not possible. Astronauts using AR glasses will receive feedback from MoniAR via visual cues as they progress through procedures on the spacecraft. The visual cues will be provided when MoniAR determines the astronaut is executing a task (a specific step in the procedure) that deviates from the current procedure. MoniAR will then guide the astronaut back to completing the task in a way that fits with the procedure. During execution, the current and upcoming tasks are proactively displayed to the astronaut in a readable form. The key innovation is to apply Case-Based Reasoning (CBR) to enable MoniAR to predict the task the astronaut is beginning to execute rather than recognize it when completed. This look-ahead capability enables guidance to be provided early enough to avoid procedure/task failure. Moreover, CBR takes advantage of the astronaut's extensive training to capture how procedures/tasks are completed and, thereby, avoid a cumbersome and brittle modeling effort. Astronaut procedures will be represented as tasks in a plan using Action Notation Modeling Language (ANML), a planning language already being used to represent astronaut procedures. By representing the procedures as plans, the different ways a procedure can be correctly executed will be captured directly from the existing procedures.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Adventium Enterprises, LLC	Lead Organization	Industry	Minneapolis, Minnesota
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Minnesota	Texas

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Adventium Enterprises, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Transitions

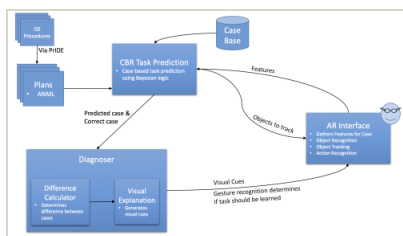
▶ **June 2016:** Project Start

✓ **December 2016:** Closed out

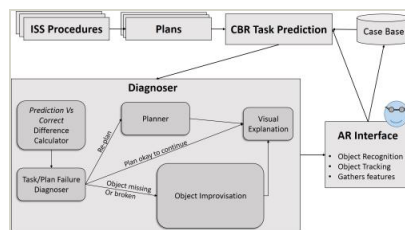
Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139647>)

Images

**Briefing Chart Image**

MonitAR, Phase I

(<https://techport.nasa.gov/image/125948>)**Final Summary Chart Image**

MonitAR, Phase I Project Image

(<https://techport.nasa.gov/image/128093>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

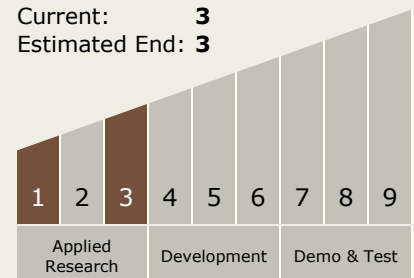
Carlos Torrez

Principal Investigator:

Hayley Borck

Technology Maturity (TRL)

Start: **1**
 Current: **3**
 Estimated End: **3**



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Technology Areas

Primary:

- TX04 Robotic Systems
 - └ TX04.4 Human-Robot Interaction
 - └ TX04.4.1 Multi-Modal and Proximate Interaction

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System